

CLAIMS

What is claimed is:

1. A method for at least in part inhibiting anti-parallel coiled coil formation of a coronavirus spike protein of a coronavirus, said method comprising:
decreasing contact between heptad repeat regions of said coronavirus spike protein.
2. The method according to claim 1 wherein a peptide and/or a functional fragment and/or an equivalent thereof decreases contact between heptad repeat regions of said coronavirus spike protein.
3. The method according to claim 2 wherein the peptide and/or a functional fragment and/or an equivalent thereof comprises a heptad repeat region of a coronavirus spike protein.
4. The method according to claim 1, claim 2, or claim 3, wherein said heptad repeat region comprises an amino acid sequence of SARS HR2 and/or HR1 according to FIG. 1, and/or a functional fragment and/or a derivative thereof.
5. The method according to claim 1, wherein an antibody and/or a functional fragment and/or an equivalent thereof decreases contact between heptad repeat regions of said coronavirus spike protein.
6. The method according to claim 1, claim 2, claim 3, claim 4, or claim 5, wherein the coronavirus comprises a group 1 coronavirus.
7. The method according to claim 6, wherein the coronavirus comprises a feline corona virus.
8. The method according to claim 7, wherein the coronavirus comprises a feline infectious peritonitis (FIP) virus.
9. The method according to claim 6, wherein the coronavirus comprises a human corona virus.
10. The method according to claim 1, claim 2, claim 3, claim 4, or claim 5, wherein the coronavirus comprises a group 2 coronavirus.
11. The method according to claim 10, wherein said coronavirus comprises a mouse hepatitis virus (MHV).

12. A method according to claim 1, claim 2, claim 3, claim 4, or claim 5, wherein the coronavirus causes Severe Acute Respiratory Syndrome (SARS).
13. A method for inhibiting of coronavirus spike protein mediated cell to cell fusion, said method comprising:
 - decreasing contact between heptad repeat regions of said coronavirus spike protein.
14. A method of selecting a compound that binds to a heptad repeat region of a coronavirus spike protein, said method comprising:
 - contacting *in vitro* at least one heptad region of a coronavirus spike protein with a collection of compounds, and
 - measuring the formation of an anti-parallel coiled coil in said coronavirus spike protein.
15. A compound selected by the method of claim 14.
16. An antibody, functional fragment, and/or derivative thereof, said antibody, functional fragment, and/or derivative thereof capable of decreasing the contact between heptad repeat regions of a coronavirus spike protein.
17. A composition comprising:
 - the compound of claim 15, and/or
 - an antibody and/or a functional fragment and/or a derivative thereof, capable of decreasing the contact between heptad repeat regions of a coronavirus spike protein, and
 - a suitable diluent and/ or carrier.
18. A method of treating coronavirus infections in a subject, said method comprising:
 - providing to the subject the composition of claim 17.
19. A diagnostic kit for detecting coronavirus infection in a sample of a subject, said diagnostic kit comprising:
 - the compound of claim 15 or an antibody, functional fragment, and/or derivative thereof, said antibody, functional fragment, and/or derivative thereof capable of decreasing the contact between heptad repeat regions of a coronavirus spike protein, together with
 - means of detecting binding of said compound or antibody functional fragment, and/or derivative thereof to the coronavirus.

20. A diagnostic kit for detecting antibodies directed against coronavirus in a sample from a subject, said diagnostic kit comprising:
 - the compound according to claim 15, and
 - means for detecting binding of said compound to said antibodies.
21. A method of attenuating a coronavirus, said method comprising:
 - decreasing the contact between heptad repeat regions of the spike protein of said coronavirus.
22. An attenuated coronavirus having decreased contact between heptad repeat regions of the spike protein of said attenuated coronavirus.
23. The method according to claim 3 wherein said peptide comprises an amino acid sequence according to peptide sHR2-1, and/or sHR2-2, and/or sHR2-8, and/or sHR2-9 as depicted in FIG. 11 B, and/or a functional fragment and/or an equivalent thereof.
24. A method for at least in part inhibiting a fusion of a coronavirus with a cell membrane, said method comprising decreasing binding of a fusion peptide with said cell membrane.
25. The method according to claim 24, wherein said fusion peptide comprises the amino acid sequence of SARS-CoV as depicted in FIG. 17.
26. The method according to claim 24, wherein a specific binding molecule for said fusion peptide decreases binding of a fusion peptide with said cell membrane.
27. The method according to claim 26, wherein said specific binding molecule is an antibody, functional fragment thereof, and/or derivative thereof.